230 Comparison of three methods to measure body composition in patients with cystic fibrosis. Relation with retrotricipital skinfold thickness and brachial circumference

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Fifty-five patients with cystic fibrosis, 27 girls and 28 boys, participated in this study. The mean age was 14±5 years at the time of the examination and the age range was 4 to 29 years. Four skinfolds and the brachial circumference were measured in all patients, and the percentage of fat mass and muscle circumference were calculated. Fifty patients underwent dual energy X-ray absorptiometry (Hologic® QDR 4500) and 38 underwent bioelectric impedance measurements (Bodystat® QuadScan 4000).

The relationship between fat mass (FM) and lean body mass (LBM) was highly significant as calculated by the three methods: for LBM, $r = 0.98$ to 0.99, and for FM, $r = 0.81$ to 0.95, depending on the pair of measures used ($p < 0.001$). Anthropometry overestimated LBM by 8±4% compared with absorptiometry and by 6±7% compared with impedance measurement. Impedance measurement overestimated it by 4±6% ($p < 0.001$) compared with absorptiometry. High correlations were also found between the anthropometric, absorptiometric and impedance measurements of LBM and the muscle circumference ($r = 0.86$, $r = 0.83$ and $r = 0.84$, $p < 0.001$) and FM and the retrotricipital skinfold thickness ($r = 0.76$, $r = 0.75$ and $r = 0.60$, $p < 0.001$).

Measuring retrotricipital skinfold thickness and brachial circumference and calculating the muscle circumference are rapid and simple methods to evaluate body composition during clinical consultation. The excellent correlation between the three methods of measuring body composition validates all of them for use in patients with cystic fibrosis but the results were not identical and each should be interpreted in terms of its own references values.

231* Adiponectin levels and body composition of cystic fibrosis patients

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Adiponectin is an adipocytokine with anti-inflammatory and insulin-sensitizing properties. Adiponectin is low in obesity and high in conditions with energy deficit.

Objective: To evaluate adiponectin concentration in CF patients and correlate it with body composition.

Subjects: 18 stable CF patients [mean age (±SD): 14.97±5.82 yrs] and 18 healthy controls, matched for body mass index (BMI), age and sex.

Methods: Bioelectrical Impedance Analysis [%Body Fat (%BF) and %Lean Mass (%LM)], CT-scan at the L3-L4 level for visceral adipose tissue (VAT) measurement (CF patients). HOMA-IR for insulin resistance (IR) and serum adiponectin (ELISA, R&D-Systems) were measured.

Results: Although weight and height were significantly lower in CF patients than controls ($p < 0.05$), BMI and %BF were comparable. HOMA-IR was also comparable. CF males were significantly taller ($p = 0.038$) than females. Absolute and %LM were significantly higher in CF males and %BF in females ($p < 0.001$). Adiponectin was higher in CF patients than controls (12.07±6.56 vs. 10.67±4.4 μg/ml) and in CF females as compared to CF males (13.83±7.85 vs. 10.31±4.77 μg/ml)not statistically significant). Adiponectin was significantly higher in pre-pubertal CF patients in comparison to pubertal (14.82±8.01 vs. 8.18±1.85 μg/ml, $p = 0.040$) and comparable to CF adults (10.52±3.72 μg/ml). Adiponectin correlated with %BF ($r = 0.507$, $p = 0.044$) but was not affected by the amount or percentage of VAT.

Conclusion: CF patients have higher serum adiponectin than healthy controls. This may be attributed to the energy deficit inherent to the disease.

232* Is puberty delayed in cystic fibrosis?

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Introduction: Cystic Fibrosis patients have been reported to have delayed growth and onset of puberty.

Aim: The aim of this study was to assess the pubertal status in a group of CF patients in relation to their age.

Patients and Methods: In 19 patients (9M) ranging in age from 7 to 19 years, Shwachman Score (SS), body mass index (BMI) and % body fat (%BF) were evaluated. Gonadotropin (FSH, LH), sex hormones (estrogens, testosterone) and DHEA'S were measured.

Results: The results are shown in the table. No correlation was found with BMI-SDS, %BF and SS.

Conclusions: Although the onset of puberty in these patients was found to be within the acceptable age range of 8 to 14 years, it occurred at the latest normal limit. Furthermore, approximately one third of the patients had low hormone secretion for their corresponding age as compared to the reference values.

Patient hormone values-1

Age/Gender	7M	7F	9F	9F	9M	10F	12M	13F	15F
FSH	1.31	2.7	3.59	5.49	0.48	4.75	0.22	1.83	5.93
LH	0.12	<0.1	0.14	0.14	<0.1	0.33	<0.1	0.16	1.06
E2	<20	<20	<20	<20	<20	24.7	<20	<20	23.4
TESTO	<20	<20	<20	<20	<20	<20	<20	<20	62.5
DHEA's	18.9	17.4	18	16.8	<15	22.1	45.4	<15	57.6

Patient hormone values-2

Age/Gender	15M	15F	15M	16M	16F	17M	17M	18F	18F	19M
FSH	1.96	6.43	6.94	1.83	6.84	5.91	1.04	8.59	5.35	3.35
LH	1.41	6.73	6.63	0.53	4.93	5.37	0.3	39.5	3.26	3.05
E2	32.7	<20	<20	<20	25.9	27.6	<20	116	36	24.4
TESTO	585	66	1151	302	57	752	213	<20	44	441
DHEA's	67.1	162	–	182	98	352	56.3	103	67.3	340

233 Carotenoid supplementation in CF – How to find a way to do it safely?

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Intake of carotenoids is under discussion since β-carotene (BC) failed in clinical efficacy trials. Nevertheless, there is still a need for carotenoids in CF. BC supplementation in CF patients led to improved FEV1 and a lower need of antibiotics. Recently, Schupp et al. reported lutein deficiency in plasma and a decreased macular pigment in CF patients. This might be of relevance in older CF patients since an earlier development of age-related macular degeneration might occur.

Smokers on increased dosages of BC in the intervention trials showed a higher mortality because of lung cancer and cardiovascular complications. As shown by our group these effects might be related to oxidative BC breakdown products (BP) leading to inhibition of enzymes, to mitochondrial damage, and to genotoxic effects. However, BCBP will develop only when high BC tissue concentrations are reached and increased oxidative stress is present. CF patients showing a high degree of inflammation in their lung tissue might possibly be on a similar risk.

However, due to malabsorption of lipids increased BC tissue concentrations can hardly be reached in CF and, in addition, a careful monitoring of plasma levels should avoid overdosing. Furthermore, maintenance of sufficient levels of other antioxidants should protect carotenoids in vivo. On the other hand, in vitro studies showed that secondary antioxidants in cells, such as the 20S-proteasome, are able to degrade proteins oxidized by BCBP, but only to a certain extent. In conclusion, safe conditions for carotenoid supplementation in CF patients can be reached and, therefore, a new approach of regular supplementation of carotenoids should be discussed